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☞See advertisement on last page.

Poetry.

WILLIE.

How beautiful was Willie,
With his curls of sunny hair ;
With his loving, laughing eyes,
Unshadowed by a care :
His voice so glad and joyous,
So full of love and mirth—
Oh! he was very beautiful,
Too beautiful for earth

He was lovely, very lovely,
And we loved him but too well,
Though we knew it not till o'er his face
The dim death shadow fell.
We felt it when our darling
Was lying cold and still,
With a seal of death upon his lips,
And on his heart the chill.

An idol was our Willie—
An idol frail as fair :
Ah! me we fondly grudge the grave,
The beauty hidden there,
But his memory is with us,
A pure and holy thing—
Our love for him around our hearts
For evermore will cling.

We loved him very dearly,
But He who lent the gem
Hath taken it again, to shine
In the Saviour's diadem.
He has taken home sweet Willie,
Our beautiful and blest—
Shall we mourn because " the fatherless"
Has found his father's rest ?

We are very sad and lonely,
When we miss his joyous face,
But we know there is one seraph more,
In the 'high and holy place.'
We will plant fresh bowers above him,
Their gentle breath to shed,
Above the quiet resting place
Of our beloved dead,
For pure and fair as they, was he
O'er whom the dust is spread.

LOVE.

BY THE LATE THOMAS HOOD.

There is dew for the flow'ret,
And honey for the bee :
And bowers for the wild-bird,
And love for you and me !

There are tears for the many,
And pleasure for the few ;
But the world pass on dear,
There's love for me and you !

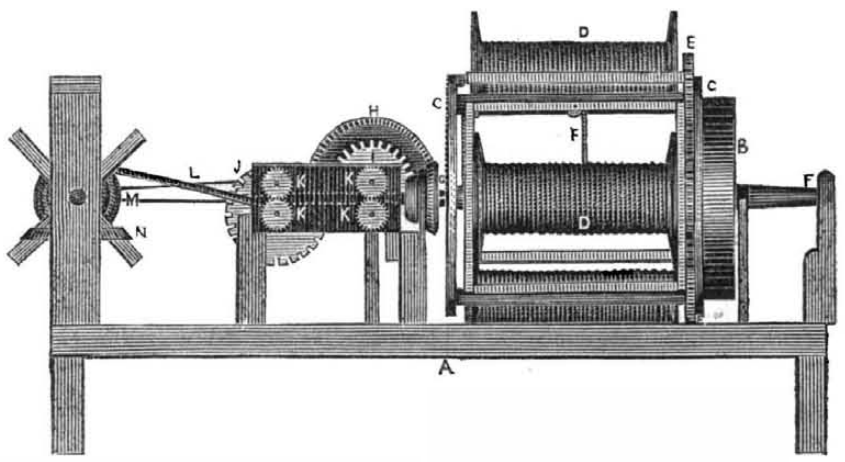
There is Care that will not leave us,
And Pain that will not flee ;
But on our hearth unaltered
Sits Love, 'tween you and me !

Our love, it ne'er was reckoned,
Yet good it is and true ;
It's half the world to me, dear,
It's all the world to you !

Artesian Wells in Texas.

The Galveston News says that Col. Thos. Wm. Ward of Austin has commenced boring for water, and expected to penetrate to the depth of 300 feet in a fortnight.

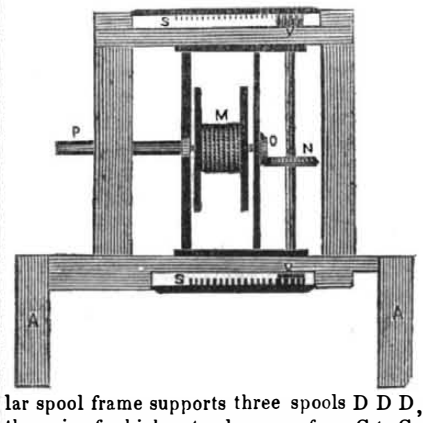
NEW MACHINE FOR MAKING ROPES.---Figure 1.



This machine is the invention of Henry A. Clum, of Walworth, Wayne Co., N. Y. who has taken measures to secure a patent for the same. Its object is to make ropes, twisting the strands from a number of spools set in a large reel and managing the twist so as to form the rope in a very small space—yet controlling the degree of twist in the most perfect manner, as it is well known that on this depends the principal value of the rope—as overtwisting detracts from its strength. It can also make rope in a very rapid manner and it therefore combines a number of economic advantages.

Fig. 1 is a side elevation, and fig. 2 is an end view of the receiving reel on which the finished rope is wound. A, is a stout frame with uprights to support the machinery above B, is a driving pulley, and F, is the centre or shaft of a large circular spool frame of which C C are the circular ends. This circu-

FIG. 2.



lar spool frame supports three spools D D D, the axis of which extends across from C to C, near the periphery of it, and they are made to revolve with it. Each spool D, however, is placed in a frame by itself and while the large spool frame revolves the smaller spools with their frames have another and a faster motion inside by a compensation gearing E. Thus there are two motions in the large frame, viz. the motion of the frame itself and the spools with the minor frames inside, which are driven at about four times the speed of the large spool frame. The strands to make the rope—one from each spool—passes up at F over a small pulley in the cross piece of the minor spool frame—then passes along to the left over another small pulley seen at the corner, then down and through an eye near the periphery of C, and from thence into the laying collar G, where three strands meet and are laid, as it is technically termed—twisted together into the rope—after which they are drawn through between the breeding rollers K K, on to the receiving reel M. The breeding rollers, as will readily be noticed get their motion from G, driving the bevel wheel H, and H driving a pinion I, on the shaft, and J, on the other breeding roller.

The receiving frame has a reel M, upon it, which can be put on and taken out of the said frame. The reel is driven by a belt L, from a pulley on the shaft of J, fig 1 and drives the shaft P, fig 2. The end of the reel shaft communicates motion to the bevel pinion O, by being inserted in the collar or recess of the shaft O This bevel pinion drives the wheel N, and moves a vertical shaft having a pinion V, on each end. These two pinions mesh into a rack S, S, one above and one below ; this rack shifts across, but that is all, while the reel and vertical shaft traverse before the breeding rollers backwards and forwards to fill the reel evenly with the rope. The way in which the receiving reel frame is moved is by the pinions V V, which travel round the rack S, biting along and reversing the motion of the reel frame alternately. The bottom and top of the reel frame is guided in grooves by slides. From the foregoing, we believe that the action of this machine will be understood, and with the exception of the gearing to give the spools a greater motion than the large spool frame, and the strand passing from the eye of C to G, which cannot well be seen in a side view, all the parts are here displayed. This machine has been tried and has more than realized the expectations of the inventor and many others besides. It is certainly simple and it makes ropes with surprising rapidity.

A Good Deed.

Theodore S. Faxon, Esq. of Utica, N. Y. last week subscribed for 100 shares of the stock of the Water Works Co., amounting to $2,500, and made a donation of the same to the Orphan Asylum. Mr. F. begun life a stage driver, and was penniless. He is a man of great energy, prudent and industrious. From driving horses, he became a proprietor—afterwards went extensively into the packet business in the Erie Canal. He has accumulated wealth rapidly, and is now an extensive stockholder in banks, railroads, factories and telegraph lines. To the latter he now devotes most of his time ; the investments paying better than any other business.

Singular Phenomena.

The most singular display of light ever witnessed, says the Cincinnati Nonpareil of 23d ult., " took place last evening about ten o'clock in the western horizon. A bright streak of light shot suddenly up from the verge of the horizon, and after attaining an altitude of about 45 degrees, burst assunder, and spread over the whole surface of the heavens, making every thing for an instant plainly visible. It was followed by five other bursts of light, all of equal splendor, and rising from near the same place—it then gradually disappeared. The so called " Northern Lights" have been often seen and admired, but we believe Western Lights will soon eclipse them."

RAILROAD NEWS.

Great Northern Central Railroad.

The amount of travel and freight upon the great Central Railway, via Fitchburg, Keene, and the Connecticut Valley, to Canada and the Lakes, has thus far much exceeded the expectations of its friends.—The route bids fair to become a great and favourite thoroughfare. Even at this inclement season, the morning trains, of two cars each from the North and South, are usually full, and the evening trains, we hear, are well supported. The freight trains are very large and will make it necessary to run night trains.

Railroad Collision.

A fearful collision occurred last week on the Camden and Amboy passenger train from the New York and the through transportation train from Philadelphia, at West's turn-out. The trains were not in sight of each other till just before the collision, as they were turning one of the curves. As soon as the engineers saw each other (says the State Gazette,) they reversed their engines, but seeing that the collision was inevitable they all jumped off. The locomotives struck with great violence tearing up the track, and making perfect wrecks of each other. Fortunately the passengers were not hurt.

The train run off the Erie Railroad a little above Piermont last week, tearing up the track in a most beautiful manner.

The Massachusetts and Vermont Railroad was opened on the 20th ult.

The Cleveland and Columbus Railroad, in Ohio, is progressing rapidly.

The loan of $500,000 offered by the Hudson River Railroad has been all taken. There were numerous bidders.

About $23,000 have been subscribed on the books of the Syracuse and Binghampton Railroad.

A Race with a Locomotive.

As the train of cars which conveyed the stockholders and invited guests to the " opening of the Vermont and Massachusetts Railroad" was leaving Northfield, on its return, a horse attached to a sleigh became frightened and breaking from his fastening, soon distanced the cars, took the track, and for two or three miles kept clear of the train. The exciting race was finally terminated by the horse, who politely turned out and gave the train the whole of the road. A noble Newfoundland dog, holding on by the "skin of his teeth" to the buffalo robe, accompanied the horse in this Gilpin race, and, as the long train passed them, they both preserved a quiet yet respectful dignity, as much as to say, we only yield to superior power.

Bridging the Ohio.

Mr. Ellet proposes to build a suspension bridge over the Ohio, between Cincinnati and Covington, to cost $300,000, and not to interfere with the navigation. The gigantic arch is to be 120 feet above the centre of the river at low water, or fifty-two feet above the great flood of 1832—the towers for the suspension of the wire cables 230 feet high—twenty cables four inches in diameter, capable of sustaining a weight of 7000 tons. The lower House of the Ohio Legislature has passed a bill incorporating a company to build the bridge.

Lynn has a population of 12,000, 8,000 of whom, of both sexes are engaged in making boots and shoes. 3,000,000 pairs were "created" last year.

The Middlesex Company at Lowell, Mass. make use annually of 6,000,000 teasels, 1,716,000 lbs fine wool, 80,000 lbs. glue, $60,000 worth dye stuffs, and $17,000 worth of soap

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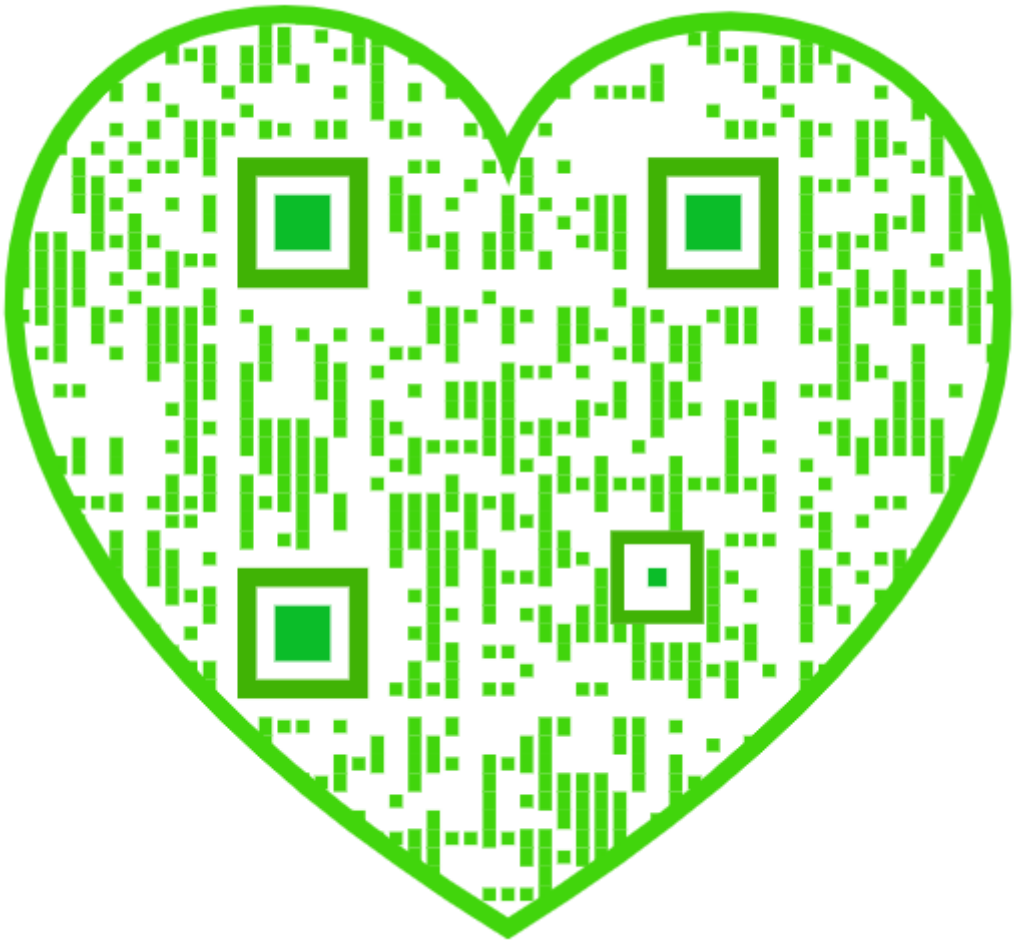

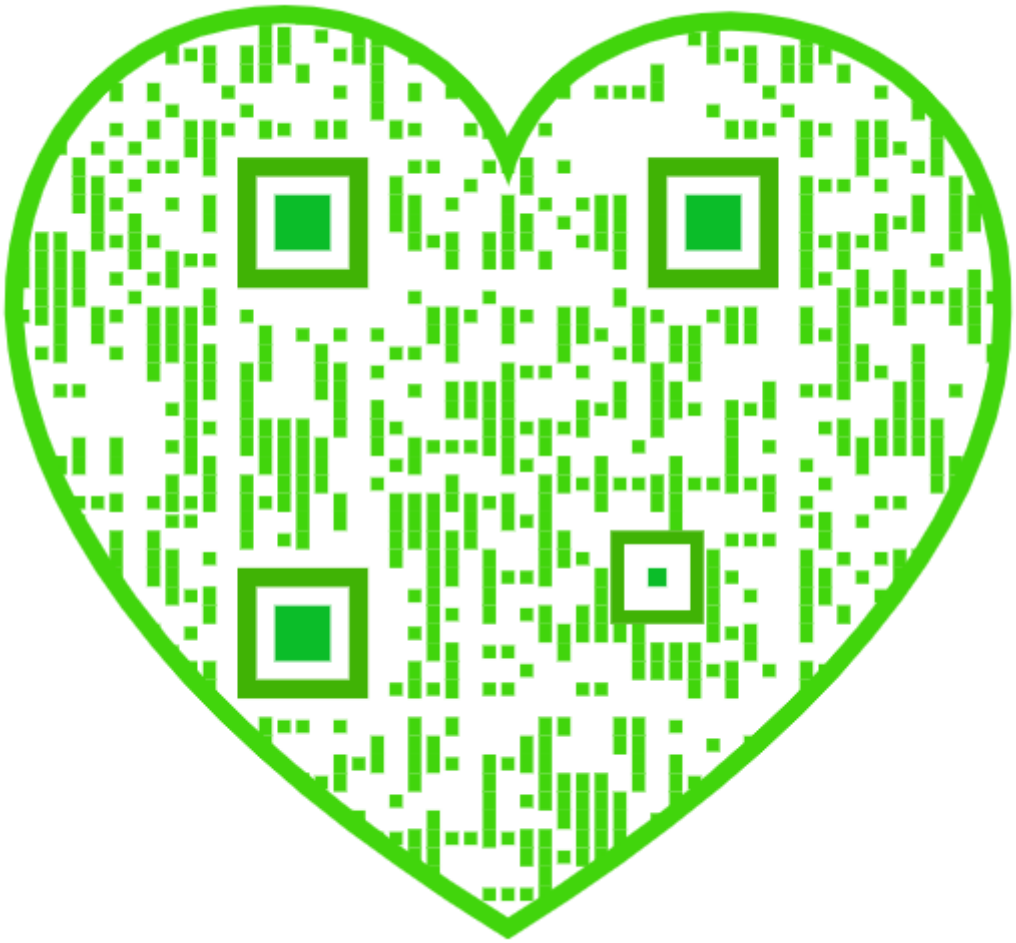

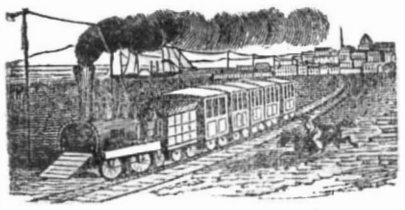

The Inauguration and the Message.

Zachary Taylor is now President of the United States. He was inaugurated on last Monday at the Capitol, which was crowded with innumerable visitors from every part of our country. His message is brief, clear and manly. Its import is " to be guided by the constitution, administer the laws impartially, to make honesty, capacity and fidelity indispensable requisites to the bestowal of office." The following gentlemen compose his cabinet, and let us hope and pray that his administration may be peaceful prosperous and happy :

John M. Clayton, of Delaware, Secretary of State; Wm. M. Meredith, of Pennsylvania, Secretary of Treasury ; Thomas Ewing, of Ohio, Secretary of the Home Department ; Wm. B Preston, of Virginia, Secretary of the Navy; George W. Crawford, of Georgia, Secretary of War ; Jacob Collamer, of Vermont, Postmaster General ; Reverdy Johnson, of Maryland, Attorney General.

A Great Telegraphic Enterprize.

Messrs. Beach, proprietors of the New York Sun, have negociated for a line of Telegraph, soon to be erected, from Washington to the Sun's editorial room, and from Boston to the same centre. The object of the enterprize is to get the news more correct than by the present telegraphic companies, and to get it at all times, untrammelled by any other kind of business on the wires, but that of newspaper literature. This is the greatest undertaking on record, we believe, connected with newspaper enterprize; and, what is very generous, other papers are invited to share the news on exceedingly moderate terms.

New Cotton.

A new species of Cotton, called the Prolific Pomegranate surpassing any of the gossypium family, has been grown in Mississippi by Gen. Mitchell, of Warren Co. The tops and side branches are all thickly studded with bolls. The stalk does not attain a height usually of more than four or five feet, but every portion of the plant is literally covered with bolls, which are sustained in an upright position by the strength and vigor of the stem and branches. The chief peculiarity of this plant is that the stem and branches have no joints as in other kinds, and although the bolls are so numerous, there can be no inconvenience in picking. The staple is beautiful, and far more silky than the best Petit Gulf.

How to behave at the Court Dinner.

The following insipid directions for persons attending the inauguration, last Monday, were given in that sublimely insipid sheet, the Court Journal, at Washington :

" A glass bowl half-filled with tepid water, and scented with a few drops of orange-flower water, is placed before each guest, into which he should insert the extremities of his fingers noiselessly, and then wipe them, also a small glass tumbler half filled with tepid water is sometimes placed in the bowl; this is used to rinse the mouth, and is a universal custom on the continent of Europe; a small quantity of this water is taken into the mouth, noiselessly, and then the head is bent forward over the bowl, and the water is allowed to run out of the mouth into the bowl--the mouth is then wiped, and the napkin is taken away with the bowl."

New Fire Department.

A citizen of Middletown, Conn. proposes, (instead of paying firemen) that the inhabitants should organize themselves into a mutual company for the purpose of insurance, and also of putting out fires. With a view to bring the citizens into his scheme, the said mutual fire department is to stand by idly, as quiet spectators, and let the property of those who do not belong to the company burn up, in case it should take fire !

A large colony of Belgians is about proceeding to California.

LITERARY NOTICES.

Holden's Dollar Magazine.

The March number of this unrivalled and justly celebrated Magazine has made its appearance upon our table, as usual. We are glad to know that the enterprise of the publisher in furnishing such a cheap publication, has been responded to by a large list of subscribers. This number presents well executed engravings of Niagara Falls ; Louis Napoleon the first President of France ; Elihu Burritt the Learned Blacksmith, and also an excellent likeness of the Rev. Dr. Baird, accompanied by Sigma's usual interesting biography. In consequence of an unexpected attack of the yellow fever our friend Holden, has been removed to the California Hospital, but his readers may expect that his spirit will continue breathing life and interest to the magazine. The literary contents for this month are unusually interesting.

The Miners Guide and Mettallurgist's Directory.

This is a very neat pocket volume, edited by J. W. Orton, Esq. one who is well qualified for such a task, and published by A. S Barnes & Co., New York. It is a hand book which should be in the possession, not of any one class of men, but all classes. To persons who are intending a journey onward to the gold or mining regions, it would be an excellent companion.

The New England Farmer for March is a excellent number. This is a valuable periodical.

The Western Journal, published by Tarver and Risk, St. Louis, Mo. is one of the best Magazines for useful information in the Western world.

We have received the Report of the survey of the Cleveland and Pittsburg Railroad, Ohio, accompanied with a beautiful map, by the Chief Engineer, Geo. R. Eichbaum.—The Report is a very able one.

Hon. Thos. H. Benton and Hon. Geo. Ashmun will please accept our thanks for valuable public documents.

Properties of Charcoal.

The properties of carbon are numerous; they have been partly studied, but every day produces new facts: when it is in a state of ignition, it posseses some very remarkable properties.

When a piece of ignited charcoal, which is very clean and free from ash, is immersed into a solution of a metallic salt, it reduces the metallic salt which is contained in it, and the metal itself is deposited with all its natural brilliancy on the piece of charcoal. Thus, the salts of tin, copper, platina, palladium, mercury, silver and gold, &c., furnish most brilliant deposits.

M. Lazowski has remarked, he says, that when the salts are too acid or too much concentrated, no effect is produced. The dilute solutions of the salts of copper often yield, by covering the charcoal, the most varied shades of color, from the finest azure blue to that of metallic copper. The parts of the charcoal upon which certain metals are deposited in preference, are the extremities; whilst other metals cover equally all the surface of the reducing body ; at other times, and this occurs with the protochloride of tin, the metal appears in very brilliant crystals, disseminated on the periphery of the charcoal.

United States and Scotland.

The Glasgow Post says that " a project is in contemplation of bringing Glasgow into direct steam communication with the United States of America. In fact, preparations for carrying the undertaking into effect have already commenced. A contemporary mentions that the keel of the first vessel of this line has just been laid down by Messrs. Denny, Brother, of Dumbarton. The vessel is to be of iron, and of 1,000 tons burden She is to be on the screw principle, and fully ship-rigged. The vessel will be propelled by engines of 250 horse power, which are in course of construction by the Messrs. Caird, of Greenock. The new steamer is intended to ply directly from the Broomielaw, the name of the ship wharf in Glasgow.

American Antiquities.

Several specimens of American antiquities have recently arrived at New Orleans which were excavated by a traveller from ancient ruins near San Luis Potosi, in Mexico. They comprise two idols and a sacrificial basin hewn from solid blocks of sandstone and are in good preservation. The largest of the idols was undoubtedly the god of sacrifice, and one of the most important. It is of life size, and the only complete specimen of the kind that has ever been discovered and brought away from the country. The anatomical proportions and beauty of this statue are not admired, but the elaborate work upon its entire surface attracts at once the attention of the beholder. It is principally ornamental, interspersed with symbols of mythology, and occasional hieroglyphics. It has two faces representing youth and old age. The right hand forms an aperture, in which a light burned during the time of sacrifice.

The smaller idol is the god of sorrow, to whom worshippers came to offer up their devotions for the tears it shed, and the relief it afforded them in their griefs. This statue is diminutive, the carvings plain, and the whole simply devised. The sacrificial basin measures two feet in diameter and displays much skill and truth in the workmanship. It is held by two serpents entwined, with their heads reversed—the symbol of eternity, which enters largely into the mythology of the ancient Egyptians.

Wells.

Artesian Wells are more common in the South, than is perhaps, imagined here. A writer in the Charleston Evening News states that they exist in hundreds in Green, Dallas, Wilcox, Perry, Sumter, Louisiana, and Arkansas. They vary in depth from 800 to 900 feet. In Albany the water is invariably found on passing through a certain rock which sinks or nips slowly in the South west. Several have been undertaken in South Carolina, near Charleston, at various times, but have been unsuccessful and were abandoned. One is in progress now which has reached a great depth, the object being to supply the city with water. Boring for water in this country has not been generally as successful as in France, for the reason that in the latter region scientific men are always consulted before such speculations are finally resolved on.

Bad and good Luck at a Fire.

During the burning of the Broadway House in Albany N. Y. on the 25th ult. so sudden was the progress of the flames, that the interior was burned nearly away before all the lodgers could remove their baggage. One gentleman, who had, before retiring for the night placed his gold watch on the table, under his hankerchief, and his pocket book, containing $150, in bed, under his pillow, was more fortunate than the rest. When the alarm of fire was given, in the confusion of the moment he left them behind, and only roccollected them when it was too late to return. After the fire was subdued, he took a shovel and went to work to remove the rubbish, when, indeed, he discovered not only pocket book and money, but his watch, which was only slightly discolored by smoke.

More of California Gold.

The Washington Union publishes the following anecdote about the gold soil of California. We consider it to be the best story extant upon the subject and deserving a medal.

" We have just heard a very curious anecdote from an American who has recently returned from Liverpool. He obtained it from Gen. Armstrong, who had it immediately from the gardener of the Earl of Darby himself. The Earl lives within about eight miles of Liverpool. He had just received some bulbous roots from California, wrapped in the dirt of their native country ; and as a mere matter of curiosity, he directed the earth to be washed for the purpose of seeing whether it contained any particles of gold. His instructions were followed, and the result was nearly a handful of gold dust and shells from the washing of the earth."

Air is 816 times lighter than water, not 8 times only, as an item in our last stated.

Yea and Nay Machine.

A yea and nay machine has been fitted up in the Pennsylvania Legislature. The members vote by touching keys (for yeas and nays) placed at each desk ; the result of each touch being a perforation on the yea or nay side of a printed list of members named. One vote of 58 yeas and 40 nays, was recorded in less than two seconds.

Fall of the White Water Canal Culvert and Aqueduct.

We learn from the Cincinnati Commerical that on the night of the 21st ult., owing to the sudden departure of the frost from the materials, or something else, the culvert under the aqueduct at Mill Creek gave way ; and as the aqueduct rested on the culvert, it followed as a consequence, making a total smash of the whole ! The aqueduct and culvert cost an immense sum at first, and their being rebuilt two or three times, seems in no way to lessen expense. The aqueduct is some 200 or 300 feet long : the cost is some $100,000 !

Certain Rights.

All men are endowed with inalienable rights—except poor men. All men who do not pay their honest debts are great scamps—except those who cheat on a large scale. All men are born free and equal—except negroes. All men are sinners—except those who belong to the Church. All men are allowed to think and act freely—except those who work for a living. All well dressed, accomplished women are ladies—except factory girls.

A Roman Prophecy of Washington.

In one of Cicero's fragments, the following remarkable sentence occurs, written some eighteen hundred years ago : " Far across the ocean, if we may credit the Sybiline books, and after many ages, an extensive and rich country will be discovered, and in it will arise a hero, who by his counsel and arms will deliver his country from the slavery by which she was oppressed. This shall he do under favorable auspices ; and oh ! how much more admirable will he be than our Brutus and Camillus ? These predictions were known to our Accius, and embellished with the ornaments of poetry."

[The above is going the rounds and it would be a treat to many to know in what fragment of Cicero's works, the above is to be found.

The English man-of-war steamer Cormorant, was recently supplied at Port Camosack, Vancouver's Island, with sixty-two tons of good coal in three days. The coal at Chili and Port Famine is also abundant, and the Pacific may be easily navigated by steamers.

All the Orange trees in Florida have been killed by the late severe frost. On one plantation, that of Capt. Bennett, near Apalachicola, four thousaud trees were killed in one night. The loss falls heavier upon the planters.

The American Institute passed a resolution not long since against the admission of persons not members of the Institute to the meetings. Under this regulation the public, for whose enlightenment the Institute was established, will be shut out from its learned and luminous discussions.

A line of telegraph is now being constructed from Nashville, through Clarksville and Parucah, to St. Louis. The first section was completed some days ago.

In a letter to Mr. Crosby, an extensive English Iron manufacturer, it is stated that the Bank of England has become mortgagee in possession of several iron manufacturing establishments. The writer complains that in making offers of sale he is constantly met with the reply that the Bank of England will sell considerably lower.

The Duke of Argyle and sons, and Lady Blantyre, have been excommunicated by Bishop Trover, a tractarian, for attending divine service in Glasgow, in a Presbyterian church. What of it.

One of the monstrous bed plates for the Steamer Atlantic was cast by Messrs, Stillman, Allen & Co. on Friday, at the Novelty Works. It weighs over thirty-four tons. A number of persons were present on the occasion and all were highly gratified.

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For the Scientific American.

The Mineralogist.—The description and locality of every important Mineral in the United States.

(*Continued.*)

ASBESTOS.

Occurs massive, composed of fibres of various lengths, either straight, curved, or star-like. Color, green, greenish-gray or yellowish gray. Fibres are not elastic nor flexible. On the edges it is transparent. It has a shining lustre, and a weight nearly three times that of water. Found at Washington and N. Haven, Ct., abundantly in New Castle Co., Del.; on the top of the Green Mts.; on the banks of the Hudson, and Island of N. York. *Amianthus*, a variety of this mineral, has been manufactured into cloth and paper, which is incombustible. It is also used for the packing of high-pressure steam-engines.

ASPARAGUS STONE.

Occurs only in crystals. Colors, green, and white. Dissolves in acids without bubbling. Found in Germantown, Pa.; Morris Co. N. J.; Highlands, at Anthony's Nose; near Lake Champlain; on the Island of New York.

AUGITE. (PYROXENE.

Occurs in crystals, in grains, and in masses. Color, brownish, blackish, or yellowish green, and white or gray. Lustre, glossy or faintly shining. Consists of plates or leaves. Three times heavier than water. Fusible. Found in Kingsbridge, Munroe (in iron mines), and Ticonderoga, N. Y.; Litchfield, Brookfield, Washington and Canaan, Ct.; Deerfield, Bolton, and Pittsfield, Mass.; 5 and 8 miles from Baltimore, Md.; Bytown, L. C.

AUTOMOLITE (GAHMITE.)

Occurs in small, dark green, 8-sided crystals; 4 times heavier than water; scratches glass. Found at the Franklin Iron works, N. J.

BARYTES, SULPHATE OF (HEAVY SPAR.)

Occurs in rounded masses, of a yellow, brown or black color. Gives the odor of rotten eggs when rubbed or heated. Yields to the knife, Compared with water it is 4 times heavier.—Localities are, Middlefield, and Greenfield, Mass. Livngston's lead mine, the Highland. near the Hudson, and Little Falls, N. Y.; Berlin, Cheshire, Southington, Farmington, and Hartford, Ct.; Hartfield and Southampton, Mass. on the west side of Paulin's Kill, and near Scotch Plains, also, near Newton N. J.; 3 miles west of North Hope in Buck's Co., Perkiomen lead mine, and at the foot of Blue Ridge in Bedford Co., Pa., near Lexington, Ky.; Liberty, Frederick Co., and Washington Co., Md.

BERYL (AQUA MARINE.)

Occurs in green 6-sided crystals. Scratches glass. Often transparent. Twice as heavy as water. Infusible but turns white. Found at Acworth, N. H. in crystals 2 feet in diameter. Chesterfield, Goshen, and near Northampton and Boston, Mass. Topsham, Bowdoinham, Cumberland Co., and Lincoln Co., Me.; Cumberland, R. I.; Haddam, Litchfield, Middle Haddam, Brooklyn and Chatham, Ct.; Chesnut Hill, East Marlborough, Germantown, Chester Co., Pa.

BISMUTH.

Occurs in shapeless masses, feathery, or net-like; also, crystallized. It consists of thin plates. Soft. Lustre brilliant; tarnishable. 9 times heavier than water. Easily melts, and dissolves in aqua fortis. Found at Munroe, Trumbull, and Huntington, Ct.

BITTER SPAR. (RHOMB SPAR.)

Color, yellowish or grayish white. Consists of plates, which may be separated. Lustre pearly and shining. Transparent. Brittle. When heated it turns to quicklime; dissolves in acids. Occurs at Great Barrington, Middlefield, Adams, Hinsdale, Windsor, Sheffield, and Pittsfield, Mass.; Washington, Litchfield, and Milford hills, Ct.

BITUMINOUS LIMESTONE.

Color, brown. When heated or rubbed, yields an unpleasant odor. When burned, becomes inodorous, and loses its color, and turns to lime. Occurs near Middletown, Ct., presenting impressions of fish.

BITUMINOUS SHALE.

Its structure is slaty, of a brown or black color. Yields to the knife. Twice as heavy as water. Emits the smell of bitumen when heated, and often burns. Frequently contains impression of fish and vegetables. Found in the R. I. Coal beds, and Westfield, Ct.; and nearly every state.

BORATE OF LIME. (DATHOLITE.)

Occurs in small, glassy crystals, usually colorless or a little yellowish, grayish, or greenish white. Yields to the knife. Three times heavier than water. Forms a jelly with acids. Turns white in the flame of a candle. Found at Paterson, N. J.; Hampden and Middlefield: Ct.

BOTRYOLITE.

Occurs resembling grapes, and in rounded concretions formed of layers. Color, white, gray, and red in circles; on the outside yellowish gray. Twice heavier than water—Found near Passaic Falls, N. J.

BRUCITE.

Occurs in grains and crystaline masses, of a yellowish brown or wine color, and pearly lustre. Thrice heavier than water Infusible but turns white. Found at Sparta and Sussex Co., N. J.; Warwick, N. Y.

BUCHOLZITE.

Occurs in masses. Colors, black and white arranged in spots. Its lustre is glassy, and fragments wedge-shaped. Consists of fibres. Scratches glass. Found at Brandywine Creek, Del. (*To be continued.*)

For the Scientific American.

Expansion of Steam.

(*Concluded.*)

Again let the cylinder of the Steam Engine be supposed divided into 4 equal divisions the initial pressure same as stated before and cut off at a quarter, or after the piston has travelled through the first division, when the piston has arrived at the second division the same effect would follow as before stated, that is we should expand eight lbs. of steam and have eight lbs. remaining in the cylinder; at the third division we should have same as before 5 1-3 lbs., 10 2-3 lbs. expanded; but at the last division or end of the stroke, pressure four lbs. 12 lbs being expanded.

Now it appears from the above reasoning that if we know the initial pressure of steam and the point at which it is cut off we can easily trace out the effect of expansion due to these elements.

To illustrate the subject farther, suppose again we have a cylinder with the dimensions as previously stated and assuming now the diameter to be 40 inches the area of which is 1256.6 and cut this steam off as before at 1-8, now we should not only use but 1 8 of a cylinder of steam, but this 1-8 would be multiplied 3 1-5 times, that is whatever work this 1-8 was capable of doing, its performance must be multiplied 3 1-5 times, to get the whole amount of work that it could do. Now if we imagine the cylinder to be one foot in length working full stroke with 16 lbs. pressure of steam the area as before 1256.6, multiplied by 16 lbs. gives 20105.6 lbs. raised one foot high—this evidently is the effect of the 1-8 of a cylinder of steam. Now by allowing this given quantity to expand into 8 times its original volume, although the pressure is reduced from 16 lbs., its initial entrance, to 6.15 the mean or average throughout the stroke, yet we shall have 1256.6X6.15=7728 09 lbs. raised 8 feet high or 7728.09X8=61824.72 lbs. raised one foot high in the same time; now the one foot of steam could lift 20105 6 lbs. one foot high, so that 20105.6 lbs. from 61824.72 lbs. leaves 41719.12 lbs. of clear gain from expansion.

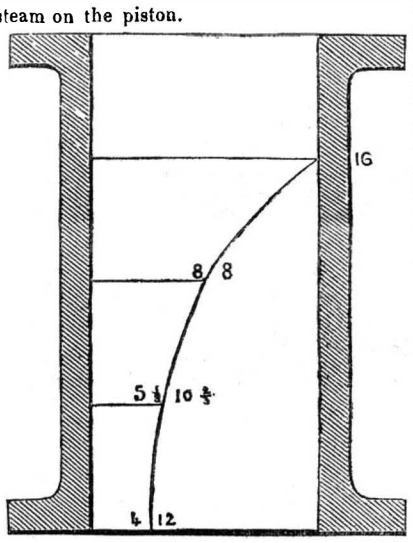
Another example—suppose the cylinder 4 feet stroke and cut off at 1-4, the other elements the same, the work done with the 1-4 of a cylinder of steam would be the same as before and by expanding this 1-4 into four times its original volume, its performance would be multiplied 2 2 5 times so that in this case the mean pressure being 9.54 lbs., throughout the stroke, area 1256.6X9.54 gives 11987.96 lbs. raised 4 feet high or 11987.96X4 gives 47951.-84 lbs. raised one foot high in the same time; here we have also a clear gain of 27846.24 lbs.

Now from what has been said it appears that the shorter the steam is cut off, the more we gain from expansion, and this is true in theory, but will not hold good in practice unless carrying very high steam, too high indeed for general safety; the reason is that when low steam is carried and cut off short the expansion is so great, the steam loses very nearly all its elasticity before the piston has arrived at the end of the stroke, and then there is nothing but the momentum of the machinery to carry it on to the end.

Take two cylinders, let one of them be 8 feet stroke, steam 16 lbs. pressure cut off at ½ stroke and let the other be 4 feet stroke, same pressure of steam, but working whole stroke. Now the 4 foot stroke would do a certain amount of work, and the 8 foot one would do just as much before the steam was cut off, because the two cylinders would be the same from the beginning of stroke to where steam was cut off, and although there is no more steam used in the one case than the other, yet by allowing the 4 feet of steam to expand into double volume—we gain more than double the effect, for the area of both pistons being the same 12-56.6 inches, the mean pressure, that is the average of pressure on the 4 foot one, would be 16 lbs. throughout the stroke. The area 1256.6X16 lbs. will give the whole pressure on the piston and as previously stated this would be 20-105.6 lbs. this raised 4 feet high (the length of the stroke) gives 80422.4 lbs. raised one foot high in the same time, this would be evidently the effect of the 4 foot stroke, the 8 foot stroke having the same area of piston would be pressed with the same force from the commencement of the stroke to where the steam is cut off, but as the steam by expansion loses part of its force the average pressure would be but 13.54 lbs., now the 1256.6 inches area X13.54 lbs. gives 16974.36 lbs. pressure on the piston, but as this piston has to travel twice as far as the 4 foot one, 16974.36 lbs.X8 feet gives 135794.91 lbs. raised one foot high.

Here we see by using steam expansively although there is not a pound more expended in one case than the other yet we have a clear gain of 118820.55 lbs.

In estimating the horse power of the condensing engine the pressure of the vacuum obtained must be added to the mean pressure of steam on the piston.



The accompanying diagram is intended to represent a cylinder of 8 feet stroke with the steam cut off at 1-4 the curve (called the hyperbolic curve) shows the diminution of the steam from the time it is cut off to the end of the stroke the figures 8—5 1-3 and 4 is the pressure of the steam at those points, and the others 8—10 2-3 and 12—the amount of expansion at the same points the area of the interior of the curve may be counted as the expenditure of steam and the exterior area as the expansion or clear gain. The pencil of the indicator when the steam is cut off at a 1-4 stroke, should trace out this curve although there are very few engines that will come up to this, still the nearer they can come to it the more perfect will be their expansive principles.

How to Construct Plank Roads.

Lay out the intended line with care to avoid steep inclinations, never ascending more than one foot in thirty or forty, and winding many feet around rather than go up one. Grade the road bed wide enough for two wagon tracks but plank only one. Lay down flat wise two stringers, twelve by three, four feet apart centre to centre. Imbed them well in the earth; across them, at right angles, lay three inch hemlock plank, eight feet long,—Pack the earth well up to them; slope the earth track toward the ditches (which should be wide and deep), and your Plank road is made.

The inner stringers should be higher than the outer ones, so as to carry the water off freely. They should be in two pieces, each 6 by 3, so as to break joints. The ends of the planks should not be laid to a line, but project a few inches on each side alternately, so as to make it easy for wheels to get on the track, and to avoid forming a rut alongside. They need not be fastened down, but spiked down, say, every fifth or tenth plank, the rest being well driven against these.—When hemlock plank get worn down 2 inches the knots project so as to make the road too rough, and to require renewal. Allow one inch more to hold them in and we have three inches thickness. Hemlock is generally used as cheapest, but pine or oak would be better.

The cost of the road will vary with the price of lumber. On the plan recommended it will require 127,000 feet of plank, 32,000 feet of stringers per mile: in all about 160,000 feet board measure. Other items of cost are the levelling the road bed and laying the plank, which costs from 50 cents to $1 per rod. The excavations and embankments necessary to give the road proper grades, and the bridges and sluices cannot be esitmated without the data of a survey, but the price per mile may be set down at $2,000 with lumber at $9, and omitting extra excavations and embankments, and gate houses. The difference of a dollar per 1,000 in the price of lumber, makes a difference of $170 per mile.

As to durability, seven years for hemlock would be a safe estimate, though our experience is as yet very limited. One set of stringers will outlast two or three coverings of plank. But, to be profitable, the plank must have so much travel as to wear them out before they rot out. The wear and tear of the first year equals that of the following six, as a tough elastic coating of woody fibres, &c. is soon formed, and protects the plank from wear. On one road, the passage of 160,000 teams wore the plank down but one inch.

Charcoal Roads.

As the public are settling upon the determination to improve in some way the Western roads, attention is claimed in Wisconsin for those formed of Charcoal, which are asserted to be more durable and costing two-thirds less than the plank roads. One of these is now being built from Port Uloa, in Washington Co. to some point in Dodge Co. The contracts are let ot $1 61½ per rod or $499,20, and $520 per mile.

Population of the British Empire.

The inhabitants of the United Kingdom, according to the returns made in 1845, numbered about 20,000,000. The colonists, (subject and tributaries,) in the colonies and settlements belonging to the British Empire, amount to about 136,079,000, making together about 156,000,000. There are only three European states with a population more numerous: Russia with 63 millions; Austria, with 37 millions; and France, with 35 millions. But taking the whole British Empire, it is certain that no other state in the world is peopled so extensively, excepting the Chinese; but that is doubtful, because Chinese statistics are not to be depended upon The British Empire is more than four times as populous as France—twice and a half as large as Russia; and amounts alone to as much as the population of Russia, Austria, France, Prussia, Spain, and Holland.—The whole human race is estimatsd at 800,-000,000; the British Empire at 156,000,000; so that its population comprises upwards of one-fifth of the human race. The population tributary or subject on the British people numbers five times its own amount.

Large Ichthyosaurus.

The largest specimen of this remarkable fossil reptile, as yet in this country, has just been received by Prof. Webster, from Somersetshire, England. It is seven feet long, and with the rock in which it is embedded weighs half a ton. The Professor has also added it to the mineralogical and geological cabinet of Harvard College, where, we have no doubt, it will be quite at home with its old acquaintance the Mastadon, obtained by the same gentleman, from New Jersey, a year or two since.

Gold in Maryland.

A rich vein of gold has recently been discovered on the farm of Mr. J Ellicott 25 miles West of Baltimore. The purity of the gold is stated to be *remarkable*.

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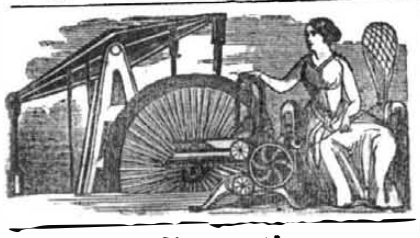


New Inventions.

The Topographer.

Mr. J. M. Steed, of Parkersburg, Va., has invented an instrument named a topographer, for measuring heights and distances in a manner very different from the odometer or any other instrument. The whole apparatus except two levers are enclosed in a box and buckled to the front of the body. The two levers extended from the ankles to the waist and act upon two sets of wheels, one set to ascertain horizontal distances and the other two ascertain ascents and descents by regestering particular marks by a pencil on a strip of paper wound round a small roller.

The weight of the whole apparatus including the case will be about 3 or 4 pounds and a person having one on, by walking over the route of any proposed road, canal &c., the amount of excavating, and filling up to obtain any required grade is shown by a profile, and dial on the end of the registering roller. It indicates at any point the distance from the surface to a level with the starting point upon the ground passed over. It is designed to enable engineers to dispense with the use of chains, &c. and thus avoid considerable expense, and the inventor and many others, believe that a single person by it will be able to accomplish as much surveying, locating and grading of Roads, &c. in one day, as can be done by a corps of engineers, and what is more important, the operator does not require much skill or practice, he has but little to do but note the magnetic courses of the lines—the residue being regestered by the instrument.

Measures have been taken to secure a patent.

Improvement in Lumber Wagons.

Mr. David W. Seeley, of Carlisle, Schoharie Co. this State, has recently invented a valuable improvement for connecting the fore axle and wheels to the bolster or body of a wagon in a firm and substantial manner, and dispensing with the use of the old fashioned hounds, block-tongue, sway-bars and sand-board; and doing away with the necessity of boring the bolster and axle for the king bolt. This improvement consists in the employment of two metallic circular plates, the one bolted to the axle and the other to the bolster and perch, and these firmly connected by a cast iron bolt so peculiarly constructed as to make it impossible to separate the fore axle from the bolster without first removing one of the fore wheels and placing the axle in a position at right angles with its working position, which it will be seen brings one arm of the axle directly under the perch.

New Reciprocating Paddles.

Mr. Jacob Ruxer, of Somers, N. Y. has invented a new plan of operating paddles, so as to give them a reciprocating motion, lifting them vertically out of the water when they have made the full stroke and moving them forward horizontally, to dip again into the water. He does not use a crank, but guides the paddles by an inclined plane, the paddles being firmly secured to a long lever.

Antifriction Roller Box.

Some of our Boston exchanges say that Mr. Joseph Harris of Boston, has invented and patented a box and axle which require no oil, and yet almost completely escapes that destroying angel of machinery, friction. They state that "Mr. Harris put his axle box in a lathe and turned 1000 revolutions in a minute, a motion which, with a common sized railroad truck-wheel, would carry it about two miles a minute, or 120 miles an hour, without producing any perceptible heat, and without the use of a particle of oil. The mechanism by which a result so desirable and astonishing is effected, is somewhat after the manner of that discovered by the prophet Ezekiel in his vision, "a wheel in the middle of a wheel," or rather, six wheels in the middle of one. The box is about five inches in diameter, and the axle three inches, and in the space between them are disposed at equal distances, six anti-friction rollers, which are kept in their places by teeth at both their ends, playing in corresponding circles of teeth in both the box and axle. There is no bearing upon these teeth, which are cut to the anti-friction curve. The bearing is entirely upon the smooth portion of the rollers between the teeth.—The only service of the teeth is to prevent the possibility of the rollers getting out of place."

There may be something about this anti-friction roller box which is not made public, but the description we have seen, conveys no other idea of its *novelty* except in stating it to *be new.*

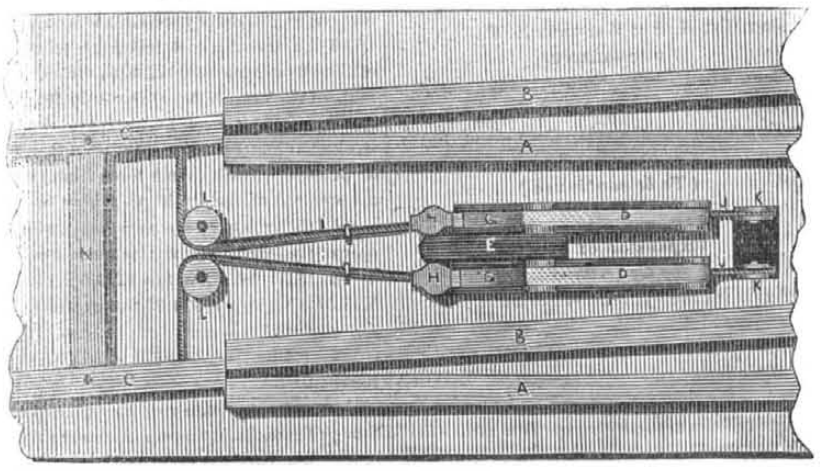
Improvement in Striking Bells.

Mr. T. Reeves of this city, has made an improvement in ringing bells, by mounting the bell so as to be moved by a ratchet and allowing the hammer to strike 240 times on the circumference of the bell—a new spot every stroke. This is a good improvement for striking large bells; heretofore they have been struck always on one spot, which was the cause of many fractures in ponderous fire bells.

New Perpetual Motion.

The perpetual motion which we noticed some time ago, as having been invented in Madison, Ga. by a Mr. Ricter, is described by the Augusta Sentinel to be "a wheel, about 6 inches in diameter, which sets itself in motion and runs with increased velocity, until stopped by the application of external power."—

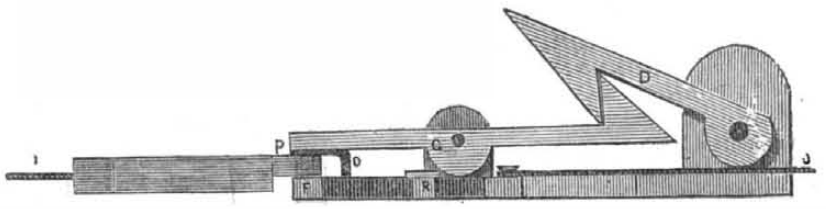
NEW RAILROAD SWITCH.---Figure 1.



This Switch is the invention of William C. Hicks, of Rutland, Vermont. Its object is to shift the rail or rails by the locomotive, so as the change of the track will be effected without any attention of the switchman before the locomotive comes up the line on which the train has to run.

Fig 1, is a horizontal ground plan, and fig. 2, a side view. The same letters indicate like parts on both figures. A, are the rails of the turn out. B, are the rails of the main track, and C, are the switch rails. D, are notched levers of the form seen in fig 2, moving on fulcrums and secured permanently between the tracks at some distance from the switch rails. E, is an oblong plank secured firmly in front and between D D. F, are planks arranged at the sides with slots in them through which pass permanent bolts secured underneath for F to slide on and be guided. G, is an under notched lever which vibrates on a centre, and D catches into it, as seen in fig 2.—The chain blocks H H, are attached to G G, by a bolt as seen in the dotted lines fig. 2, and the chains I, pass around horizontal pulleys L L, and are secured to C C, the switch rails.

Figure 2.



I I, are other chains attached to G G, fig. 1, and passing under D D, over pulleys K K, down into a pit below and have weights hung on their ends. O, is a bent wire inserted in the surface of F, the slotted sliding blocks and are hooked over the ends of H H, so that when the sliding blocks F F, are drawn forward, H will be held down, but it drawn back H will be set free from the bolt which couples it to G, at P, fig. 2.

Operation.—Supposing the track to be set as in fig. 1, and the locomotive to be approach the switch rails C C, on the track B B, there is a cam on the lower part of the locomotive which would strike D on the right hand side and force the notched end downwards, depressing the notched end of G at the same time causing its other end at P, fig. 2, to rise and the bolt be raised out of the eye of H, and the right hand chain I, set free from the weight below on the rope J, when the weight on I on the left hand will pull the switch rails over to the right, there being no equilibrium weight on that side to be a balance against its operation, and thus shift the switch rails before the locomotive comes up. Mr. Hicks has made application to have his Switch secured by letters patent.

Cast Iron Leg.

The Philadelphia Ledger states, that one of the most perfect artificial legs that has ever been constructed, is one made mostly of cast iron, invented by Mr. G. W. Yeager, South Third st. Philadelphia, for Mr. J. P. Smith of the United States Engineers who lost his limb in the battle of Cherubusco. The artificial leg only weighs 2 pounds 11 ounces, and it is so perfect that the knee and the ankle motions belonging to the natural leg and foot can all be performed with nearly as much facility as the manufactured one. The springs allow the natural play of the foot, and the leg instead of hanging back in walking, as we see frequently in the wooden legs, comes properly forward, obedient to the will of the wearer. It is allowed by skillful surgeons in Philadelphia, to whom it has been submitted for inspection, to be the best one of the kind that has ever been made. This is saying a great deal for the invention.

Manufacture of Coke for Iron.

The most important operation in the manufacture of iron, is preparing fuel for the furnaces, a work of the greatest importance, as upon it depends the quality of iron produced.

The best fuel is charcoal, which is consumed in the Swedish furnaces, in Russia, and in many parts of America, and was formerly employed in England, until the vast increase of the manufacture rendered the employment of such a substance impossible. Even in the time of Elizabeth, the great consumption of wood in the iron works induced the Parliament to prohibit by statute the use of such a fuel. Since sufficient charcoal cannot be obtained, the next object is to procure a fuel nearly resembling it, and this is Coke.

Coke is made as follows: A large quantity of bituminous coal being spread over the ground, the mass is lighted, and when the flames begin to rise, the whole bed of burning matter is covered with ashes to keep out the air, after which the coal is left to burn out and by this process becomes changed into coke.

Should a person unacquainted with the various works of an iron district be conducted into the midst of such a country on a dark night, he would suppose himself placed in the heart of some volcanic region. Here is a valley spreading one fiery bed, resembling a lake of molten matter, swelling with its fierce glow above the surface; there on the side of a bleak mountain, a flaming chasm seems opened in the side of a volcano.

However grand these coking fields may appear to a stranger, the manufacturer is to much engaged in the operation to pay attention to its picturesque circumstances, as profit alone not a striking scene, is his object. The anxiety often attending the work may be estimated from the immense loss sometimes occasioned during one stormy night, when the wind sweeping along an exposed hill prevents the burning mass from being effectually covered by the ashes, in consequence of which an inferior coke is produced, and enormous quantities of the fuel consumed, in spite of all the coker's care. In such a night, a hundred tons of coal may thus be lost by exposure to the atmosphere, an important item in the expenses of a manufacture, requiring the most rigid economy in all its branches. The loss of the fuel, however, is the least mischief produced by a bad coking; the iron will be deteriorated by the defects of the coke, when the latter retains sulphur or silex; and the effects will be seen through every stage of the manufacture, and be at last evident in the quality of the iron itself when brought to market.

Coking Kilns have lately been introduced in some places, but their expense upon a very large scale must be immense, and whether they will ever supersede the coke pits or not is very doubtful. Charcoal made from peat is beginning to be introduced in England for the select iron to make steel. It is far better than coke, and said to be better than wood charcoal. The iron that is made in the northern parts of this State and Massachusetts is of a very superior quality to the English iron, but many lament that it is not better, and give as a reason, that "with wood charcoal and our quality of ores we should equal any Swedish brand."

Electricity Developed, &c.

That elegant and correct experimentalist, Faraday, has shown that zinc and platinum wires, one-eighteenth of an inch in diameter and about half an inch long, dipped into dilute sulphuric acid, so weak that it is not sensibly sour to the tongue, will evolve more electricity in one twentieth of a minute than is given by thirty turns of a large and powerful plate electrical machine in full action; a quantity which, if passed through the head of a cat, is sufficient to kill it, as by a flash of lightning. Pursuing this interesting inquiry still further, it is found that a single grain of water contains as much electricity as could be accumulated in 800,000 Leyden jars, each requiring thirty turns of the large machine of the Royal Institution to charge it,—a quantity equal to that which is developed from a charged thunder-cloud. "Yet we have it under perfect command; can evolve, direct, and employ it at pleasure; and when it has performed its full work of electrolization, it has only separated the elements of a single grain of water."

Cholera Cures.

Dr. John W. Moore states in a Mobile paper, that he cured one hundred or more extreme cases of cholera, not losing one, by the use of tobacco. He administered it in the form of an emetic of the strength of one drachm to a pint.—He first tried it upon a negro whose pulse was gone, his tongue cold, and his muscles so rigid that he rested only on his head and heels. In five minutes he was relieved, and the cure was perfected by drinking a decoction of senna. In his own case, Dr. Moore took into his stomach a spoonful of tobacco decoction, with perfect relief from cramp and diarrhœa. He has no doubt that the cholera may be as easily managed as the fevers of our country.

How many cures we have for cholera and hydrophobia and the bite of the rattlesnake; this last cure for cholera is apparently a tough one, but it has a tough foe to deal with.

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NEW YORK, MARCH 10, 1849.

To Our Subscribers.

The next number will complete the half of our present volume, and subscribers whose term expires with the said number should forward their subscriptions on the receipt of the present one.

We take this opportunity to tender again our sincere thanks to patrons and subscribers for the liberal encouragement we have hitherto received. We assure you that we will always endeavor to make the Scientific American worthy of the name which many of our correspondents award it, viz. " the only Repertory of American Inventions and Discoveries."

We have now the largest circulation of any other paper of the same nature, in the world. To you our subscribers do we owe much—to you are we indebted for the improvements we have continually been adding to the Scientific American, both in illustration and valuable matter. The information contained in our columns is more useful than entertaining, yet to the inventor, the lover of science and the intelligent mechanic it has peculiar attractions. No person in our wide country who wishes to be informed of the progress of discovery in science and art, can feel easy without a weekly visit from it. On our subscription list are to be seen the names of dwellers in every part of the civilized world. This shows that our columns are the source to which the eyes and hearts of our own people and the people of other nations are directed for information respecting American invention and discovery. We therefore, feel our responsibility for the honor of our country to be increasing with the increase of our readers, and as it is imperative that we should progress in improvement, we confidently rely on our people and our subscribers to assist us in still further extending our circulation. This costs nothing to subscribers, and a useful paper always carries a beneficial effect wherever its truths are circulated. The man who wishes to be acquainted with patent business should certainly not be without it, and those who wish to bring their inventions before the world, can find no other method so beneficial to them as to publish the same in our columns.

Persons desiring to become new subscribers, can have all the back numbers sent, so as to make a full and complete volume at the year's end, and we are positive that those who possess the back numbers, will not fail to get the future ones, for volume 4 Scientific American will be an encyclopedia of useful knowledge, for two dollars, unrivalled by works of three times the price.

Large and Small Papers.

We sometimes hear of people who after admitting this to be an excellent paper for its size, nevertheless reject it on the plea that it is not so large in proportion to the price, as some other papers. We are truly very sorry to hear that any of our countrymen are so deeply degraded in ignorance and stupidity, as to judge the value of a paper by its size merely. They might with equal propriety require a piece of rich silk at the price of coarse muslin or calico ; or appraise a piece of cabinet furniture by comparing its size with that of a barn :—as well, in fact, measure a bank note, to ascertain its value. We well know that every copy of this paper costs us three times as much as it would to issue a sheet of double its size, filled with such advertisements and common-place useless matter asis found in many of the large cheap papers. We also well know that some of the smallest papers among our exchanges are worth double of others which are three times as large. We can offer no argument, however, to such people as make that plea of rejection, considering that they are wallowing in such depths of censurable ignorance, that a common sense argument would be of no avail. Let them go.

Electricity and Cholera.

It has been proved beyond doubt that our health and feelings are greatly influenced by the variations of electricity in the atmosphere and that those states of air which lessen the electricity of our bodies are more or less injurious. It is certain that a marked relation between cholera and electricity has been observed during the recent epidemic in London ; facts are exhibited in the reports of the Registrate General which claim to be considered as something more than mere confidence.—Thus during a period of eleven weeks, beginning with September 3, on comparing the number of Cholera cases with the amount of electricity existing in the atmosphere, it was found that in the first week the number of cases was seven, while electricity could only be discovered in the air on two occasions ; in he second week four cases, while the electrical state of the air was equally low ; in the third week, three cases, with a little electricity in the air ; in the fourth week, thirty cases the electricity state being very low ; in the fifth week, forty-five cases with the same electrical deficiency ; in the sixth week, thirty-four cases, electricity as before ; in the seventh week, sixty-five cases, with a total absence of electricity ; and in the succeeding weeks, while the number of cases varied from sixty two to twenty one per week, scarcely a single indication of electricity could be found. This remarkable absence of electric phenomena appears to be an almost unique occurrence.

And therefore the Electric Belt of Mr. C. Rogers, Jefferson, Michigan, which appeared in No. 17 this volume Scientific American, and the only one that we have seen constructed on true scientific principles, should claim particular attention.

A Cold Winter.

This has been one of the severest winters on record. The snow flakes have been dancing away far South on their cold but downy pinions. At Chicago in Illinois two men and a horse were found frozen to death on the road side, likewise a boy and a Norwiegan woman. At Argyle in Washington Co this State, the thermometer has ranged for 13 days in the month from 10 to 16 degrees below zero, and has been as low as 26 degrees. It had never been above zero from the 9th of Jan. to the 16th of Feb. We do not know how the people in Franconia, N. H. have got through the winter, but some other places have been giving it a hard rub this winter.

Dr. Robbins, librarian of the Hartford, Ct. Athenæum, who is now over eighty years of age, and has kept a record of the weather from his youth up, acknowledges that the present winter beats all former ones in his record, for the extent of its coldness, as measured by the thermometer.

The First Pacific Whaler.

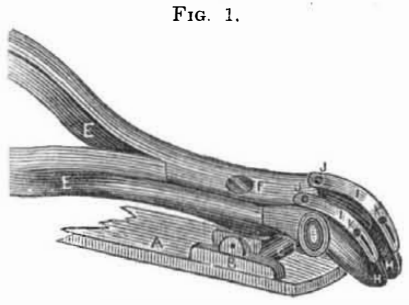
The New Bedford Mercury states that the first American whale-ship that ever visited the Pacific was the ship Rebecca, of 185 tons (then considered a very large ship.) She sailed from New Bedford in September, 1791, under the command of Capt. Kersey. It was considered an enterprise of great peril. She performed the voyage, and returned home, after an absence of fifteen months, with a full cargo of oil obtained on the coast of Chili and Peru. Capt. Joseph Kersey, now living in New Bedford at an advanced age, was a boat-steerer on that voyage.

The whaling fleet of the United States now consists of 580 ships, 20 brigs and 13 schrs.—total 613 ; of which 249 sail from New Bedford, 69 from Nantucket, 53 from New London, 49 from Fairhaven, 51 from Sag Harbor, 21 from Stonington, and from 1 to 15 from twenty-three other places.

The Finance committee of the U. S. Senate have settled upon the terms of of a bill authorizing the coinage of gold double eagles, ($20 in value,) and also of silver two and a half cent pieces, and pennies compounded of silver and copper, instead of our present clumsy and uncouth cent pieces.—The bill will also contain provisions for the appointment of a U. S. Aassayer at San Francisco, authorized to run gold of a certain fineness into bars of $100, $200, or $500 in value, to be stamped with an official mark, for conveniences in trade or transfer home.

New Tooth Extractor.

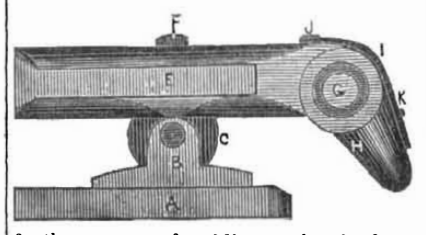
Fig. 1.



This is a new instrument for extracting teeth invented by Mr. Edward Bourne, of New Bedford, Mass. The object of it is to employ a fulcrum or rest for the forceps whereby the teeth may be extracted with much ease and the most refractory one pulled from its foundation in a twinkling An idea of its construction and combination will be derived from the accompanying engravings.

Fig. 1 is a perspective view and fig. 2 a side view. The shanks are not engraved the full length, in order to show the principal parts more full. The same letters refer to like parts. A, is a plate or lever to which the forceps are connected by an axle C, which is of a ball shape below but flat on the top, and plays in bearings at B. E E, are the shanks which are connected to the jaws crossing one another—like those of scissors. The jaws have two motions, one to open out and the other to bend round—the latter motion being

Fig. 2.



for the purpose of enabling teeth to be drawn out straight, and to have a drawing power likewise—by a spring being attached to the top of each jaw. F, is the screw that unites the two jaws and is the axis for them to expand. H, are the jaws and they are united by an axis G, fig. 2, to allow the jaws to be bent down. The said jaws are kept in position by small steel springs I I, fixed on the top of the jaws by pins J J and K K—the last of which run in small slots when the jaws are bent down. This allows the jaws to have two motions. It is a very ingenious instrument, and the inventor has taken measures to secure a patent.

Electro Magnetism as a Motive Power.

Mr. Editor.—As the subject of Electro Magnetism to move machinery, is now engaging some attention and as you have alluded to the experiments of Dr. Page, which have recently been brought before the U. S. Senate, I have thought that the following abstract of its history and the accompanying opinions regarding its merits would not be uninteresting to your readers.

Professor Oersted, of Copenhagen, Denmark, is generally allowed to be the discoverer of the electro magnet, and Professor Henry, now of Washington, the first person who demonstrated its capability to move machinery. In 1833 a mechanic named Davidson in Scotland, had an electro magnetic engine that turned one or two foot lathes. This ingenious mechanic constructed an electro magnetic locomotive that was tried on one of the British Railways but was a signal failure. In 1836 Mr. Davenport a Philadelphia mechanic, had an electro magnetic engine in public operation. In 1838 Professor Jaccobi, of St. Petersburg, Russia, propelled a boat on the Neva at the rate of about four miles an hour. In 1840 a paper was printed in this city by an electro magnetic engine, and in 1841 and '42, nothing was talked of but galvanic engines. Great numbers were made about that time in this city, but we believe there is not a single one of them at present in operation. In 1842 two patents were taken out in England to propel ships by electro magnetism, and at that time all the steam engines were to be dispatched to the moles and the bats. Alas for the new science, the reverse fortune has happened with it. In 1842 Dr Liebig warned his countrymen against the employment of electro magnetism as a motive power—viewing the question only in the light of an economist, and he proved in the most conclusive manner that it could not compete with steam.

The great difficulty in the application of electro magnetism to propel machinery, is in the decrease of attractive power according to the distance of the attracted part of the machine from the magnet. The strokes of all electro magnetic engines are therefore very short and they endeavor to make up by speed for this difficulty. All that we have seen, present as objectionable features as the majority of rotary engines.

We have seen accounts stating that Dr. Page recently delivered a lecture in Washington during which he exhibited a trip-hammer weighing fifty pounds, which produced a jarring of the whole room as it fell. Heavy blows were made in rapid succession, its motions were so easily controlled that it was let down slowly or rapidly at pleasure.

The controlling of the power of the hammer appears to be something new and useful, still we have doubts although not of a positive character regarding the economy of electro magnetism as a motive power, in comparison with steam. By late news from London it appears that a Danish gentleman named Hjorth, has constructed an electro magnetic engine of such power that one of his magnets supports 5000 lbs., but its attractive force at one eighth of an inch distant, was only 1,500 pounds—thus exhibiting the difficulty we have previously spoken of, and which presents serious objections to the employment of this power in propelling machinery. G. R.

New York March 1, 1849.

Colonization of Vancouver's Island.

The British Government has completed the grant of Vancouver's Island to the Hudson Bay Company, and they have advertised the terms upon which they invite emigrants. According to the stipulations of the grant, all profits from sales of the land or working of minerals, beyond ten per cent, are to be applied to the colonization and improvement of the Island. The price of the land is fixed by the company at £1 per acre, and it may be purchased in lots as small as 20 acres. That is five dollars per acre. Well, the British legislators are singularly defective in Colonial management. The British empire is boundless in resources and comprises every variety of soil and climate. Yet for all this, we often find thousands of her people in the very heart of Britain, starving for want. This shows how defectively her colonies are managed, and the grant of the splendid Island of Vancouver to a single company shows that she is not a whit wiser now than she has hitherto been. What emigrant will go from Britain to Vancouver's Island and pay five dollars an acre for land when he can come to the United States and purchase better for one dollar and twenty five cents. The patent grants of colonial lands, are the incubuses on the prosperity of her colonies, and our republic still feels and labors under evils arising from the old land patents. We never like to say any thing about politics—and this is not a political question but one embraced in the science of " political economy."

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Galileo.---His Life and Discoveries.

After Archimides, the first person who passed beyond the point at which the ancients stopped, and made an advance in Mechanics, was Galileo Galelei, who was born at Pisa in Italy, on the 15th of Feb. 1564.

Like most experimental philosophers, Galileo, in his early years, gave indications of that bent of mind, and intellectual superiority, which has made him rank so high among the philosophers of antiquity. Although his father was by no means wealthy, Galileo received a tolerable education. He was desirous of following the profession of a painter, but in obedience to his father's desire he entered as scholar of arts at the university of Pisa, on the 5th of November, 1581, and applied himself to the study of medicine. Music was a favorite study of Galileo's In studying the principles of this science, he found it necessary to learn something of geometry, and commenced at Euclid's Elements. The demonstrations of the mathematician, and the new and wondrous truths which this science unfolds, took such hold of the ardent mind of Galileo, that after many fruitless attempts to confine him to the study of medicine, his father gave up the attempt and allowed him to follow his own inclinations. From Euclid he ascended to the higher mathematicians ; and, while studying Archimedes' treatise on hydrostatics, he wrote an essay on the hydrostatical balance, explaining its construction, and the mode by which the philosopher of Syracuse detected the fraud committed by the jewellers in making Hero's crown. This work introduced Galileo to Guido Ubaldi, an eminent mathematician, who engaged him to investigate the subject of the centre of gravity in solid bodies ; and the treatise which he produced upon this subject was the foundation of his future celebrity.

Through his connection with Ubaldi, Galileo was appointed lecturer on mathematics at Pisa in 1589, with a yearly salary of sixty crowns, which he increased by devoting some time to private teaching At the early age of eighteen, Galileo doubted the philosophy of Aristotle ; and on his establishment at Pisa, commenced to overthrow the doctrines of this philosopher. His first inquiries were into the mechanical doctrines of Aristotle, which he soon discovered to be untenable. The errors which he found existing, he exposed to his pupils, and a rancorous controversy commenced between the followers of Aristotle on the one side, and Galileo and his pupils on the other. Argument and even experiment, failed in convincing Galileo's opponents. The doctrine that the heavier of two falling bodies would fall quicker, was disproved by the experiment of dropping bodies of different weights from the leaning tower at Pisa ; but although these bodies struck the ground nearly at the same instant, the followers of Aristotle remained unconvinced, or at least unconverted. Conscious of his superiority, and the truth of his doctrines, Galileo turned not only the powers of argument, but the shafts of ridicule and sarcasm against his opponents ; thus raising up a personal enmity, which afterwards developed itself in bitter persecution. Other circumstances increased the rancor of his enemies, and at last made his position so uncomfortable, that he gave up his situation at Pisa, and accepted the professorship of mathematics at the university of Padua, with an income of 180 florins. The death of his father having burdened Galileo with the family, he had to apply himself here as at Pisa to private teaching. Nothwithstanding his public and private duties, however, he still found leisure to make several discoveries and inventions, which were circulated in manuscript among his friends. Some of these abused the confidence reposed in them, and published several of Galileo's inventions as their own.

The doctrines of Copernicus, regarding the stability of the sun and the revolution of the pl anets, were the subject of disputation with the learned in the time of Galileo. He early beca me a convert to the new doctrines, and believ ed tn them even at the the time he was teachin g the opposite or Ptolemaic system, which r egarded the earth as stationary, and the sun a revolving body. Shortly after he went to Pa dua, he published a treatise on the sphere, in which the system of Ptolemy was supported by the very arguments which he afterwards ridiculed. It is rather considered, however, that it was sometime after the publication of this treatise that Galileo changed his opinions. About this time he commenced a correspondence with Kepler, the German astronomer, which continued till his death.

In 1593, he contracted a chronic disorder, from inadvertently sleeping at an open window, which afflicted him at intervals during the rest of his life. At this time Galileo's reputation as a philosopher was widely extended over all Europe, and many of the nobility became his pupils. His first engagement as professor at Padua was for six years. On the expiration of this term, he was re-engaged for other six years, at an advanced salary of 320 florins.

The first important discovery of Galileo was, that the vibrations of a pendulum are performed in equal times, whatever be the size of the arc described within certain limits. In 1604, a new star was discovered by astronomers in the constellation of Opiuchus, and formed the subject of much speculation. By some it was set down as a meteor ; but from the absence of parallax, Galileo proved it to be one of the fixed stars, situated far beyond the bounds of our own system.

Galileo was again appointed professor at Padua, in 1 06, and his salary increased to 520 florins. So great had his fame as a philosopher became, that the lecture room could not contain his hearers, which obliged him to lecture in the open air. Among other pursuits he investigated the property of the loadstone, and discovered a method of arming them so as to double their magnetic power.

Galileo still kept up communication with the family of the Duke of Tuscany, who had been his early patron. Cosmo, who had succeeded his father Ferdinand, had been one of Galileo's pupils, and being imbued with an ardent wish to promote science, formed the desire of attaching his former master to his household.

Negotiations were accordingly commenced. His salary as professor at Padua was to be greatly increased on the expiring of his engagement. The seclusion of private life, however, offered far greater charms to the studious philosopher. He was anxious to escape the performance of public and private duties which continually interrupted his own studies. He accordingly accepted the situation of philosopher and principal mathematician to the Grand Duke of Tuscany, with a salary of 1000 florins, and his only duties, were to lecture occasionally to sovereign princes. It was also expressly stipulated that he should have the most perfect command of his own time, to devote to study and the completion of some projected works.

During the progress of the arrangements for leaving Padua Galileo paid a visit to Venice. Here he became informed of an optical instrument, presented by a Dutchman to Prince Maurice of Nassau, which possessed the property of enlarging objects, and bringing them nearer the observer. This was confirmed by a letter which Galileo received a few days afterwards from Paris. To the consideration of this subject he immediately applied himself, and the first night after his return to Padua, he discovered what he sought in the doctrine of refracting light. He fitted a spectacle-glass to each end of a leaden tube, one of which was plano-convex, and the other plano-concave, and on applying his eye to the concave glass, he found that it magnified. Delighted with his discovery, he carried his little instrument in triumph to Venice, where it created a most intense excitement, and for a month thousands flocked to see it. He made a present of it to the Venetian Senate, and received in return a perpetual grant of the professorship at Padua, and an increase of salary from 520 to 1000 florins. It was shortly after this that he entered the household of the Grand Duke of Tuscany.

After disposing of his first instrument, which magnified only three times, Galileo applied himself to the making of another which magnified eight times, and "at length," as he says himself, "sparing neither labour nor expense," he constructed an instrument which magnified thirty times. With this instrument he discovered the inequalities of the moon's surface. "The dark and luminous spaces he regarded as indicating seas and continents, which reflected in different degrees the incidental light of the sun ; and he ascribed the phosphorescence, as it has been improperly called, or the secondary light, which is seen on the dark limb of the moon in her first and last quarters, to the reflection of the sun's light from the earth." With the telescope he discovered a striking difference between the appearance of a fixed star and the planets. The latter exhibited round and well defined discs like the moon, while the former, even of the first magnitude, appeared but as lucid points. He was likewise enabled to resolve portions of nebula and clusters, which appeared to be hazy spots in the heavens, into distinct and numerous stars.

(*To be continued.*)

Electro Magnetism as a Motive Power.

The following is the report of the select committee of the Senate, presented by Mr. Benton on the 28th ult. on the application of Dr. Page for aid in testing his new invention in Electro Magnetism.

"That the memorialist represents that he has discovered a mode of applying electro-magnetic power for the purpose of navigation and locomotion, and as a general substitute for the dangerous agency of steam ; that he has been engaged in the investigation of the subject for more than twelve years, at great expense and sacrifice ; that he is now able to demonstrate the availability of the electro-magnetic power, as a mechanical agent, upon a scale of magnitude commensurate with his limited means; that means larger than his own would be necessary to test the availability of the power in its application to the great purposes of useful navigation and locomotion; that he deems his invention worthy of national encouragement, upon the same principle that encouragement was extended by Congress to Professor Morse for telegraphing by electro-magnetism : and he prays that a select committee may be appointed to examine his invention, and to witness his experiments, and that an appropriation may be made to enable him to apply his invention on a large and useful scale.

"In pursuance to their appointment, the Committee attended the lectures now in a course of delivery in this City by Prof. Page, on electro-magnetism, and witnessed his experiments in the application of that power as a mechanical agent, and are satisfied that his past success, with his limited means, justifies the expectation of farther success from the enlarged means. The power was exhibited (among other ways) in the suspension of a mass of iron of 50 pounds, without visible support, and in the capacity of the great electro-magnet to sustain all the weight that could be crowded upon it, consisting of masses of iron and several persons, and believed capable of sustaining a weight of 10,000 pounds. Its application was exhibited in the propulsion of miniature engines, and in driving an engine of considerable power by which boards are planed with ease and smoothness.

"That the power is great, and can be applied to the useful purposes of navigation and locomotion, the committee see no reason to doubt. The inquiry which rests upon their mind is as to the cost of the production of this power, and whether it can be produced at a rate to justify its common use as a mechanical agent. On this point experience can be the only safe guide, and thus far experience is favourable. Dr. Page informs the committee that he has succeeded in largely reducing the cost of production, and expects to be able to bring it within the limits of an economical power, especially when the saving of life, as well as money, shall be comprehended under the idea of economy—safety being one of the great objects of his invention.

"Upon the examination of the power and applicability of Professor Page's invention, the committee deem it an object of national interest, that its entire ability be completely tested ; and, the sum of twenty thousand dollars being deemed necessary for him for that purpose, they recommend an appropriation accordingly, and direct their chairman to propose it as an item in the Naval Appropriation bill."

Music and Motion.

Mr. Editor.—In your Journal of Dec. 30, you state that you have received a letter from Mr. E. B. Henrick, of this place, informing you that, about ten years ago, I communicated to him facts explaining the phenomenon of sound and rapid motion similar to those recently read by Mr. Scott Russell before the meeting of the British Association for the promotion of Science. I thank Mr. Henrick for thus connecting my name with an interesting fact in musical science, and you for the opportunity given me to furnish an account of what he calls *my* discovery. I know not, nor have I taken pains to ascertain, how far I am entitled to such honor The deep interest I have ever felt in all that relates to music has led me, from boyhood, to observe and reflect upon phenomena like those to which you refer, and you may be assured I read Mr. Russell's explanation with the delight one naturally experiences on finding his own early and matured views confirmed by such high authority. As Mr. Henrick, from his friendship no doubt, has requested me to furnish an account of my observations, I cheerfully comply, simply premising that it must be brief from the nature of the case.

My attention was first attracted to this subject as far back as 1819. I was riding in a sleigh, the horses going at a brisk rate, when I observed that the bells on the horses passing me in an opposite direction *flatted in pitch* after the sleigh had passed. I noticed this fact repeatedly afterwards. Four or five years later, I began to observe and study the effect of church bells and their echoes. Fire alarms gave me frequent opportunity for observation. Going hurriedly towards the church I heard, when about midway between it and a building in the vicinity, the bell's echo from the latter. The pitch of the bell *before* me was sharper than that of its echo *behind* me. I then stopped running, and found that both agreed in pitch. On running again towards the church, and of course farther from the building, the pitch of the bell grew sharper, while that of the echo grew flatter. These curious phenomena induced me to seek other occasions for observation.

In 1834 or 1835, the Lowell Railroad went into operation. This gave me the opportunities wished for. At a crossing, say ten or fifteen feet from the track, I was standing when the engine came towards me with considerable velocity. Its bell, weighing from 50 to 75 lbs., was ringing to give warning, and it continued to ring until sometime after the engine passed. I observed that, immediately after it had passed, the pitch of the bell was flatted about half a tone. This observation was often repeated with the same result. I mentioned the facts to Mr. Henrick and other intelligent persons, and our explanation was upon the theory of vibrations urged by Mr. Scott Russell. Respectfully yours,

H. P. Munroe.

Cambridgeport, Mass. Feb. 14, 1849.

Umbrellas in Rome.

A Roman shower is a shower indeed. Put up a Parisian umbrella and it is laid flat in a twinkling. The native carries (when apprehensive of rain, which may continue three days without cessation) a ponderous machine, which, when opened out, resembles a little tent suspended in the air, under which he walks securely. The construction of the Italian umbrella is simple enough,—a mass of oiled calico is attached to a stout pole ; and this, when spread, resists the torrent wonderfully.

Cochineal.

The editors of the Savannah Republican have been shown veritable specimens of the cochineal insects taken from a cactus growing on end of the sea islands not far from that city. They exactly resemble those of commerce, while the beautiful color is precisely of the same intensity and color. The Cochineal insects have hitherto been found principally in Mexico and New Spain.

The Danish Government is about purchasing a steamer in England, to be equipped as a man-of war.

Thirty-one millions of pounds of tea were brought to London from China, last year.

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"J. P. of Boston"—We have had no tidings from Washington concerning your business since we last wrote to you. It is impossible for us to inform you when your patent will be issued.

"M. S. Jr." & "N. W. B. of Me."—In consequence of the absence of our principal examiner, to Washington, we shall not be able to proceed with your business until his return, at which time the whole matter will be duly investigated.

"W. H. W. of Mass."—We have been expecting to hear from you, and hope you will not delay much longer. The result of that business would be particularly interesting at this time.

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"J. P. of Tenn."—The money you refer to was duly received and the books forwarded as per order. We cannot account for the delay but it is probable that you will yet receive them, we have always been prompt in attending to orders from our subscribers.

"M. C. of S. C."—We are in receipt of your communication. You will hear from us more fully when the model arrives.

"W. E. of N. Y."—Your funds came safe and the specification, drawings, &c. have been forwarded to Washington.

"W. H. H. of Miss"—Much obliged to you for the remittance, and also for the fine list of subscribers who have felt such an interest in the Scientific American, as to wish its continuance. Each of them have been credited to the end of the volume.

"J. B. L"—In the matters you refer to, you will be obliged to conform to the decision of the authorities of the city or town in which you wish to exhibit. There are no fixed laws regulating them.

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THE AMERICAN PHRENOLOGICAL JOURNAL—For 1849.

EDITED BY O. S. & L. N. FOWLER.

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For the Scientific American.

Poisonous Metals.—Mercury.

This metal in its metallic form is not possessed of noxious properties, but its compounds are nearly as dangerous as arsenic. *Corrosive sublimate* is the most dangerous salt of mercury—it is something like arsenious acid in its effects—three grains of it having been known to destroy the life of an adult. Corrosive sublimate is generally found in the form of a heavy white powder, or in heavy crystalline cakes. Its taste is metallic and acrid, and can easily be detected in the mouth—being very different from arsenic in this respect. It is very soluble in water—and it faintly reddens litmus paper

When sulphuretted hydrogen gas is passed through a solution of corrosive sublimate, the sulphurett of mercury in the form of a dark brown powder is precipitated. According to Dr. Christisson sulphuretted hydrogen detects corrosive sublimate, where its proportion does not exceed a 35,000th of the whole solution. The sulphuret of mercury when dried and heated with carbonate of soda, readily furnishes a ring of pure metallic mercury. Protochloride of tin precipitates corrosive sublimate in solution in the form of a white powder, which afterwards becomes grey, and finally blackish and is said by eminent chemists to be an infallible test, affecting solutions which contain only an 80,000th part of the salt.

By immersing a polished plate of copper in a solution of corrosive sublimate acidulated with hydrochloric acid, it soon becomes coated with the reduced mercury, and it may be obtained in globules by heating the copper in a reduction tube.

Iodide of potassium causes a beautiful scarlet precipitate when introduced into a solution of corrosive sublimate. By placing a drop of strong solution of the corrosive sublimate on a gold coin, and touching the gold through the solution with an iron point, the mercury will be deposited on the coin, in the form of a bright silvery spot. This is really a beautiful test, called "the galvanic," and there are several modifications of it, but Orfila takes an exception to it and says, that "if the fluid mercury cannot be afterwards obtained in distinct globules, the evidence of it must be doubted, for tin solution can also be precipitated on gold. Dr. Taylor says it is easy to detect corrosive sublimate in organic solids by simply boiling them with copper gauze and a few drops of hydrochloric acid.

Professor Teider of Florence, says that gluten possesses the property of decomposing corrosive sublimate and therefore glue is a very convenient antidote to the poison, and the white of eggs likewise. Vegetable principles such as albumen and gelatine, possess the same properties. It is therefore plain that it acts upon the system by combining with its organic principles. Orfila states that the proper antidote to corrosive sublimate, is the white of eggs or albumen, and that corrosive sublimate digested for some time with albumen, forms an insoluble compound that may be taken into the stomach with impunity, but in cases of poisoning the stomach pump and emetics should, where it is possible, be the first applied remedies.

For the Scientific American.

Refining Gold and Silver by Quicksilver.

It is well known that quicksilver unites readily with almost all metals, and whenever added in considerable quantity, forms a paste which is called an amalgum. On the other hand, as it does not unite with the earth, it is an excellent medium for separating gold and silver from other substances with which they may be mixed. When quicksilver forms an amalgum with the precious metals, the two are separated by squeezing the mercury thro' the pores of a piece of leather, when the precious metal is left behind. There is still, however, a portion of the metal left behind, which is only driven off by heat. The amalgum of quicksilver with gold has been employed for gilding metals by rubbing the amalgum over them and afterwards heating it, till the quicksilver is driven off. The principle of separating gold from other bodies by quicksilver was known to the ancients in the days of Pliny, although some have pretended that it was a modern discovery. Vitruvius describes the whole process exactly as it is now known and practised, with the exception of distilling the quicksilver and losing none of it, a fact witb which the ancients seem not to have been acquainted. Modern mineralogists expose the amalgum to heat in a retort and collect the quicksilver in a receiver. The quicksilver becomes a vapor at a certain heat and the worm or pipe of the retort is conducted through water which condenses the quicksilver to a liquid when it is received, as already described, in a proper vessel. Quicksilver is employed in all the South American mines, to separate the silver from the earths. There are very extensive quicksilver mines near Guamanga in Peru, and it is used exclusively for refining. The quicksilver is agitated along with the precious metals in water to produce the amalgamation and the water is afterwards poured off

By the accounts we have received from California, it appears that the quicksilver in the form of cinnabar, is abundant. This is a fortunate circumstance, and renders that country doubly valuable as a gold region, inasmuch as it contains not only the precious metals in its bosom, but the means of separating the same by amalgamation. Were this not the case—had our emigrants to purchase their quicksilver in stinted quantities from abroad, the pursuit of gold, unless when it is found in separate and large particles, would not be a profitable occupation.

Ornamental Leather.

Mr. Poynter has read to the Institute of British Architects, a paper on "Ornamental Leather Hangings." He stated that this material was used in a similar way by the Egyptians 900 years B. C.; but he principally confined his remarks to the use made of it since the 16th century,—as during that and the succeeding century, it was extensively used by the richer classes, its manufacture being principally at Venice and in Flanders. From the latter country it was introduced into France; but it is doubtful if it was ever manufactured in England. Leather hangings never entirely superseded tapestry or wood panelling.—The best leather was made from goats' or calves' skin, ingeniously connected together; and the surface was silvered over previously to being painted. The effect of gold was produced by a varnish of yellow color laid on the silver. The embossing was done by the pressure from dies; the minute ornaments being produced by tools—the method adopted corresponding to that of the bookbinders of the present day. Among the various specimens of this rich style of decoration exhibited, was a large and valuable hanging of the 16th century, representing the meeting of Antony and Cleopatra, richly painted and elaborately finished in all the details of the dresses and other portions of the figures, which are the size of life. Mr. Poynter alluded to fine examples to be seen at Chatsworth, and other mansions in England; and particularly described a series of leather panels at Rouen, which are perfect.

Treatment of Fruit Trees in Winter.

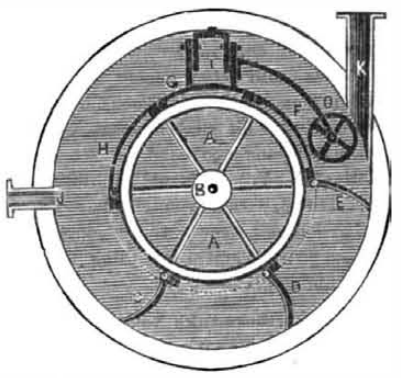
An intelligent writer observes, that to preserve fruit trees from frost, in the spring, farmers should, during the coldest weather, remove the snow from the roots around the tree, and allow the ground to freeze as deep as it will. He can then pack old hay, straw leaves, rotten wood, exhausted tan, or almost any vegetable matter, with snow and dirt, so as to form a heap around the tree of as much as four or five feet at the base, and two or three in height. This forms a temporary ice-house and prevents the premature warm weather from starting the sap, and swelling the buds, until the season is so far advanced that the fruit is not endangered from frost.—This treatment can be applied to all kinds of fruit trees, and by covering the heap with shrub soil and pressing it hard around the tree, the insect about the roots may be effectually expelled. The heap should be allowed to remain until the next autumn, when it can be taken away for the next winter's freezing. Trees treatcd in this manner are apt to become sward bound, and seldom, or never suffer from drought, as the heap always attracts a plentiful supply of moisture.

History of the Rotary Engine.

Prepared expressly for the Scientific American.

FOREMAN'S ROTARY ENGINE.

FIG. 49.



This is a rotary engine invented by Walter Foreman of Bath, England and patented in 1825. Its operation will be readily understood by the following description, and will just as soon be consigned by the reader to the place where it has been laid to rise no more.

Fig. 49 is a side view of the steam wheel, with the casing removed to shew the situation and construction of the valves, and their mode of action in the steam-way. A A, is the steam wheel revolving upon its axis B. C D E F G H, are six flap valves, having steam-tight joints, and fixed to six blocks on the periphery of the steam wheel; three of the valves are shewn open, and three closed. I is a fixed stop for arresting the course of the steam; it is composed of an upper and lower piece accurately fitting the sides of the chamber, and connected together by means of screw bolts, so contrived as to admit of an easy adjustment when the lower curved surface may become worn, by the friction of the periphery of the steam wheel in its revolutions. O is the anti-friction roller fixed to a springing curved arm, and screwed to the stop I.

FIG 50.

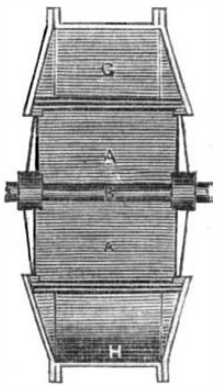


Fig. 50 is a vertical section of fig. 49 through the axis; A A, the steam wheel, B the axis, G H two valves, by which is seen their tapering figure, and the conical form of the casting which encloses them; the lower valve is shewn as closing the steam-way, and the upper one as leaving it open. It will now be perceived that the valves from this peculiar shade do not, when moving backwards or forwards, even touch the side of the casting, consequently all friction in those parts is obviated; the dotted lines in the upper valve, are intended to illustrate this observation, as they describe the course of the extreme edge of the valve, when in act of opening or shutting the steam-way.

The mode of operation with this engine is as follows: steam is admitted by the tube J, which immediately fills up the space between the stop I and the valve E, and the latter yielding to the expansive force of the vapour, gives motion to the wheel A A; when, in the revolution, the valve H takes the place of C, the flap of H (swinging upon its joint) falls by its gravity into the same position; the steam then acts against it in like manner as C, and successively the valves G F E D, in rotation, as fast as the wheel revolves, the steam finally escaping at the pipe K; the friction-roller O pressing down each flap, as they pass under its operation against the periphery of the steam wheel.

Hydrogen Gas.

This gas, the light inflammable gas of Dr. Priesley, has been chiefly collected during the solution of iron turnings in weak sulphuric acid, made by adding to oil of vitriol about six times its weight of water. An ounce of iron, according to Mr. Cavendish, produces gas equal in measure to 412 ounces of water, but as the solution is of no value, it is preferable to employ zinc, although an ounce does not produce more gas than is equal in measure to 356 ounces of water, or 5 cubic feet ·7 of gas from each avoird. pound; because the solution being boiled down and crystalized, will yield sulphate of zinc, which is more valuable; 50 pounds of oil of vitriol will dissolve 36 of iron, or 34 of zinc.

A cubic foot of pure hydrogen gas weighs about 40 grains, and of atmospheric air, about 529; but as the hydrogen gas is not aboslutely pure, the buoyancy of each cubic foot of gas in the atmosphere cannot be estimated at more than an avoirdupois ounce, from whence the varnished cloth, cords, valves, and car, must be deducted.

To Make Cloth Water Proof.

Take the purest and best glue; melt it, and when hot put into it a lump of alum. Stir it until the taste of alum is distinctly perceived. The lump may be taken out, and the size is then ready for use. Sometimes a little soap is added, as this is thought to render the size more flexible.

The above will only answer for cotton or linen cloth—no person would put glue on woolen cloth. Alum is a good substance to make cloth water proof of itself, but the cloth should be dried at a great heat.

Dry Gilding.

This is performed by steeping linen rags in a solution of gold, then burning them, and with a piece of cloth dipped in salt, rub the ashes over the silver intending to be gilt. It is not a durable process, but it does not require either much labor or gold.

Cure for the Piles.

The Salem Observer says that if three ounces of powdered alum be placed in a belt made of cotton drilling, two inches in width, and worn around the body above the loins, next the skin, it will cure the piles.

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